

WHAT IS CLAIMED IS:

Sub
H1

1. An isolated polynucleotide that encodes a human β 1A sodium channel subunit protein, said polynucleotide comprising a member selected from a group consisting of:

- (a) a polynucleotide having at least a 75% identity to a polynucleotide encoding a polypeptide consisting of amino acids 1 to 268 of SEQ.ID.NO.:14;
- (b) a polynucleotide having at least 75% identity to a polynucleotide encoding a polypeptide consisting of amino acids 150 to 268 of SEQ.ID.NO.:14;
- (c) a polynucleotide which is complementary to the polynucleotide of (a) or (b); and
- (d) a polynucleotide comprising at least 15 sequential bases of the polynucleotide of (a), (b), or (c).

2. The polynucleotide of claim 1 wherein the polynucleotide is RNA.

3. The polynucleotide of claim 1 wherein the polynucleotide is DNA.

4. The polynucleotide of claim 1, having a nucleotide sequence selected from a group consisting of: (SEQ.ID.NO.:12) and (SEQ.ID.NO.:13)

5. The polynucleotide of claim 4 further consisting of allelic variants, mutants, and functional derivatives (SEQ.ID.NO.:12) and (SEQ.ID.NO.:13).

6. The polynucleotide of claim 1, wherein said DNA molecule is genomic DNA.

7. An expression vector for expression of a human β 1A sodium channel subunit protein in a recombinant host, wherein said vector contains a recombinant

gene encoding a human β 1A sodium channel subunit protein and functional derivatives thereof.

8. The expression vector of claim 7, wherein the expression vector contains a cloned gene encoding a Human β 1A sodium channel subunit protein, having a nucleotide sequence selected from a group consisting of: (SEQ.ID.NO.:12) and (SEQ.ID.NO.:13).

9. The expression vector of claim 8, wherein the group further consists of allelic variants, mutants, and functional derivatives of SEQ.ID.NO.:12 and SEQ.ID.NO.:13.

10. The expression vector of claim 7, wherein the expression vector contains genomic DNA encoding a Human β 1A sodium channel subunit protein.

11. A recombinant host cell containing a recombinantly cloned gene encoding Human β 1A sodium channel subunit protein or a functional derivative thereof.

12. The recombinant host cell of claim 11, wherein said gene has a nucleotide sequence selected from a group consisting of: (SEQ.ID.NO.:12); (SEQ.ID.NO.:13); and functional derivatives thereof.

13. The recombinant host cell of claim 11, wherein said cloned gene is genomic DNA.

14. An isolated protein encoded by a nucleic acid sequence capable of hybridizing under stringent hybridization conditions to a nucleotide sequence having the sequence of SEQ ID NO:12 or SEQ ID NO:13 that when combined

with a Human α sodium channel subunit protein in a cell permits sodium ion flux in the cell.

15. The protein according to claim 14, having an amino acid sequence selected from a group consisting of: (SEQ.ID.NO.:14) and functional derivatives thereof.

16. A monospecific antibody immunologically reactive with a human β 1A sodium channel subunit protein.

17. A process for expression of a Human β 1A sodium channel subunit protein in a recombinant host cell, comprising:

- (a) introducing an expression vector comprising a nucleic acid sequence capable of hybridizing under stringent hybridization conditions to a nucleotide sequence, or its complementary sequence, having the sequence of SEQ ID NO:12 or SEQ ID NO:13 into a cell;
- (b) culturing the cell of step (a) under conditions which allow expression of a protein encoded by the nucleotide sequence.

18. A method of screening for a modulator of sodium channel activity comprising:

- (a) providing a cell that co-expresses a protein encoded by a nucleic acid capable of hybridizing under stringent hybridization conditions to a nucleotide sequence, or its complementary sequence, represented by SEQ ID NO:12 or SEQ ID NO:13 and a sodium channel α subunit protein wherein the cell elicits a sodium ion flux;
- (b) contacting the cell with a putative β 1A modulating compound; and
- (c) measuring a change upon the cell that alters the sodium ion flux.

Cont
A1

[illegible]

21. A compound that modulates the function of human β 1A selected using the method of claim 18.

23. A method of treating neuropathic pain in a patient in need of such treatment comprising administration of a modulating compound of Claim 21.

24. A method of treating neuropathic pain in a patient in need of such treatment comprising altering the level of a human $\beta 1A$ subunit in a dorsal root ganglia cell in the patient.

25. A method of treating chronic pain in a patient in need of such treatment comprising administering the compound of Claim 21.

26. A method of treating febrile seizures in a patient in need of such treatment comprising administering the compound of Claim 21.

27. A method of treating general epilepsy in a patient in need of such treatment comprising administering the compound of Claim 21.

28. An anticonvulsant pharmaceutical composition comprising a compound of claim 21.

29. A method of treating arrhythmia in a patient in need of such treatment comprising administering the compound of Claim 21.

30 31. A pharmaceutical composition comprising a compound of claim useful for use as a local anesthetic.

31 32. A method for decreasing neuropathic pain in an individual comprising administering to said individual a modulator of a sodium channel $\beta 1A$ subunit in an amount effective to change the sodium channel activity in said individual.

32 33. The method of claim 31 wherein said modulator decreases the expression of sodium channel $\beta 1A$ subunit in the cells of said individual.

33 34. A method for treating neuropathic pain in a subject comprising altering the level of sodium channel $\beta 1A$ subunits on the surface of a cell in a subject.

Cont
A1

34

35. A method for decreasing neuropathic pain in a human comprising the step of administering a sodium channel $\beta 1A$ subunit-binding molecule to a sodium channel $\beta 1A$ subunit-expressing cell in the human.

Variable	Mean	SD	Min	Max	Median	Q1	Q3	Mode	Skewness	Kurtosis	Shapiro-Wilk	Normality
Age	35.2	12.5	18	65	32	28	36	35	-0.1	3.2	0.98	Normal
Gender	1.2	0.4	1	2	1	1	1	1	0.2	0.5	0.95	Normal
Education	12.5	2.1	9	16	12	11	13	12	-0.2	2.8	0.99	Normal
Income	1500	500	500	3000	1200	800	1800	1000	0.5	4.5	0.92	Normal
Marital Status	1.8	0.6	1	3	2	1	3	2	-0.3	2.5	0.97	Normal
Occupation	2.5	1.2	1	4	2	1	3	2	0.1	3.0	0.96	Normal
Health Status	1.5	0.5	1	2	1	1	1	1	0.4	0.8	0.99	Normal
Stress Level	3.2	1.8	1	5	3	2	4	3	-0.1	3.5	0.97	Normal
Life Satisfaction	4.5	1.2	3	6	4	4	4	4	0.2	2.8	0.98	Normal
Resilience	2.8	1.5	1	5	3	2	4	3	-0.2	3.0	0.96	Normal
Optimism	3.8	1.0	2	5	3	3	4	3	0.1	2.5	0.99	Normal
Emotional Stability	2.2	1.2	1	4	2	1	3	2	0.3	3.2	0.95	Normal
Self-Esteem	3.5	1.5	1	5	3	2	4	3	-0.1	3.0	0.97	Normal
Life Satisfaction	4.5	1.2	3	6	4	4	4	4	0.2	2.8	0.98	Normal
Resilience	2.8	1.5	1	5	3	2	4	3	-0.2	3.0	0.96	Normal
Optimism	3.8	1.0	2	5	3	3	4	3	0.1	2.5	0.99	Normal
Emotional Stability	2.2	1.2	1	4	2	1	3	2	0.3	3.2	0.95	Normal
Self-Esteem	3.5	1.5	1	5	3	2	4	3	-0.1	3.0	0.97	Normal